IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application No.	:	10/809,764	Confirmation No. 7933
Applicant	:	George E. RICHARDS et al.	
Filed	:	3/25/2004	
Title	:	Process for Manufacturing Powder Coating Compositions Introducing Hard to Incorporate Additives and/or Providing Dynamic Color Control	
Group Art Unit	:	1791	
Examiner	:	Jeffrey Michael Wollschlager	
Customer No.	:	28289	

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Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Appellants appeal the rejections as set forth in the final Office Action mailed on February 13, 2008. This Appeal Brief is submitted in support of the Notice of Appeal electronically filed May 13, 2008. The Notice of Appeal appeals the final rejection of claims 1-9, 13-15, 17-19 and 21-24.

The headings used hereinafter and the subject matter set forth under each heading are in accordance with 37 C.F.R. § 41.37.

I hereby certify that this correspondence is being electronically submitted to the United States Patent and Trademark Office on the date set forth below.

Diane Paull
(Name of Person Mailing Paper)

Diane Paull — 07/11/2008
Signature — Date

I. REAL PARTY IN INTEREST

The real party in interest in this Appeal is PPG Industries Ohio, Inc., having acquired rights by way of an Assignment recorded in the United States Patent and Trademark Office at Reel 015958, Frame 0001, on November 8, 2004.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-9 and 12-24 are currently pending in this application. Claims 10 and 11 have been canceled. Claims 12, 16 and 20 have been withdrawn from consideration. Claims 1-9, 13-15, 17-19 and 21-24 are rejected and appealed.

IV. STATUS OF AMENDMENTS

No amendments have been filed in response to the final Office Action.

V. SUMMARY OF CLAIMED SUBJECT MATTER

In one embodiment of the invention, as set forth in claim 1, Appellants have developed a low pressure extrusion process for manufacturing thermosetting powder coating compositions. As part of this process, at least one hard to incorporate additive is added to the extruder separate from the base material. Referring in part to Fig. 1, the claimed invention comprises steps of:

(A) feeding a base material comprising as dry ingredients, a resin and a curing agent to an extruder 10 from an initial position 18 (page 1, lines 17-20; page 3, lines 13-15; page 3, line 26 – page 4, line 1; page 6, lines 25-26);

(B) injecting at least one hard to incorporate additive from a pressure vessel 44 to the base material after the base material enters the extruder 10 and before it exits the extruder, wherein the pressure in the pressure vessel is maintained at less than 100 psi (page 3, line 26 – page 4, line 1; page 7, lines 20-24; page 12, lines 11-12; original claim 11); and

(C) passing the combined base material and hard to incorporate additive(s) through at least a portion of the extruder 10 to form a thermosetting powder coating composition (page 4, lines 3-5).

In another embodiment, as set forth in claim 13, Appellants have developed an extrusion process for manufacturing thermosetting powder coating compositions that adds a hyperdispersed pigment to a base material. The hyperdispersed pigment is a dried liquid pigment dispersion formed by drying a liquid pigment dispersion. The claimed invention comprises steps of:

(A) feeding a base material comprising as dry ingredients, a resin and a curing agent to an extruder 10 from an initial position 18 (page 1, lines 17-20; page 3, lines 13-15; page 3, line 26 – page 4, line 1; page 6, lines 25-26);

(B) adding at least one hyperdispersed pigment to the base material (page 5, lines 17-19); and

(C) passing the combined base material and hyperdispersed pigment(s) through at least a portion of the extruder 10 to form a thermosetting powder coating composition (page 4, lines 3-5),

wherein the hyperdispersed pigment(s) in step (B) are added either separately from the base material or with the base materials, and when

added with the base material, the hyperdispersed pigment(s) are in the form of a dried liquid pigment dispersion that has been formed from a liquid pigment dispersion comprising greater than 5 weight percent organic solvent (page 5, lines 9, 17-28).

In another embodiment, as set forth in claim 17, Appellants have developed a process for dynamic color control in a thermosetting powder coating extrusion process. Dynamic control is achieved by monitoring extruder output and adjusting the amount of hyperdispersed pigment added to the base material. The claimed invention comprises steps of:

(A) determining an amount of hyperdispersed pigment(s) to be added to base material comprising as dry ingredients, a resin and a curing agent introduced to an extruder 10 to form a thermosetting powder of a desired color (page 8, lines 9-11; page 1, lines 17-20; page 3, lines 13-15; page 3, line 26 – page 4, line 1; page 6, lines 25-26);

(B) adding the determined amount of hyperdispersed pigment(s) to the base material (page 8, lines 9-11);

(C) monitoring the output of the extruder for accuracy of the color of the thermosetting powder coating (page 6, lines 11-13; page 8, line 13); and

(D) dynamically adjusting, as necessary, the amount of pigment(s) added at step (B) based upon the monitored output (page 6, lines 11-13; page 8, lines 11-17);

wherein the base material travels through a portion of the extruder before the addition of pigment(s) in step (B), or the pigment(s) added in step (B) are added to the extruder at the same location as

the base material, or the pigment(s) added to step (B) are added to the extruder with the base material, and when added to the extruder with the base material, the pigment(s) are in the form of a dried liquid pigment dispersion formed from a liquid dispersion comprising greater than 5 weight percent organic solvent (page 5, lines 9, 17-28).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1, 3-7 and 9 are patentable under 35 U.S.C. §103(a) over the combination of U.S. Patent No. 4,320,048 to Harmuth and U.S. Patent No. 4,973,439 to Chang et al.

2. Whether claim 2 is patentable under 35 U.S.C. §103(a) over the combination of the Harmuth and Chang patents in view of U.S. Patent No. 4,684,488 to Rudolph or U.S. Patent No. 4,919,872 to Fintel.

3. Whether claims 7 and 8 are patentable under 35 U.S.C. §103(a) over the Harmuth and Chang patents in view of U.S. Patent No. 6,638,353 to Rathschlag et al. or U.S. Patent No. 6,537,364 to Dietz et al.

4. Whether claims 13 and 15 are patentable under 35 U.S.C. §103(a) over the combination of the Harmuth patent and U.S. Patent Application No. 2003/0125417 to Vanier et al. or the Dietz patent.

5. Whether claim 14 is patentable under 35 U.S.C. §103(a) over the combination of the Harmuth and Vanier or Dietz references in view of the Rudolph or Fintel patents.

6. Whether claims 17-19 are patentable under 35 U.S.C. §103(a) over the combination of the Harmuth and Vanier or Dietz references in view of the Rudolph or Fintel patents.

7. Whether claims 21 and 22 are patentable under 35 U.S.C. §103(a) over the combination of the Harmuth and Vanier or Dietz references in view of the Chang patent.

8. Whether claims 23 and 24 are patentable under 35 U.S.C. §103(a) over the combination of the Harmuth and Vanier or Dietz references in view of the Rudolph or Fintel patents, along with the Chang patent.

VII. ARGUMENT

A. BACKGROUND OF THE INVENTION:

A typical extrusion process for producing thermosetting powder compositions involves blending or "dry mixing" the resin(s) and curing agent(s) with other dry ingredients such as colorants, catalysts, flow control additives, fillers, and/or UV stabilizers in a batch mixer. The resulting mixture is then fed to and melt compounded in the body of the extruder. As heat is applied to the extruder body, the dry mixture melts, the ingredients are compacted, and the constituents are completely dispersed in the molten resin. As the melt mix exits the extruder body as "extrudate," it is cooled rapidly on a cooled drum and then passed to a cooled belt where it is broken into granules. These granules are further processed to achieve a finer, more uniform particle size before packaging.

This conventional powder-forming process can result in significant amounts of waste if the formulation is not precise. For example, a particular mixture of dry ingredients can result in an extrudate that is slightly off color. In order to correct for inaccurate coloration, another batch of dry ingredients must be prepared. In such a

scenario, the resulting product loss is equal to the entire load of dry mixture. There remains a need for an extrusion method of producing pigmented powder coating compositions that disperses hard to incorporate additives, such as pigments, uniformly throughout the extrudate without detrimentally affecting the extrudate and/or which allows for dynamic control and more efficient clean-up between runs.

B. INSTANT INVENTION:

The present invention is directed to several low-pressure extrusion processes for producing thermosetting powder coating compositions that maintain adequate dispersion of ingredients within the extrudate despite their relatively low operating pressure. Each process involves the introduction of additives that are "hard to incorporate" into a base material that includes resin and a curing agent. These "hard to incorporate" additives are those that are not readily dispersed during the extrusion process. Examples thereof include, but are not limited to, pigments, flow additives and components having a melting point higher than the (average) melting point of the resin used in the base material (page 3, lines 22-26).

The present invention also discloses several low-pressure extrusion processes wherein at least one hard to incorporate additive is a "hyperdispersed" pigment. As defined in the specification, hyperdispersed pigments have been subjected to additional processing before their introduction into the extruder and have an average particle size of two microns or less (page 4, lines 7-10). Hyperdispersed pigments can be in a variety of forms including solid or liquid, each of which facilitate increased dispersion in the resulting extrudate.

Finally, the present invention discloses several processes for monitoring the output of the extruder for the accuracy of the color of the thermosetting powder coating and dynamically adjusting the amount of pigment that is added to the extruder as needed to dynamically control the manufactured thermosetting powder coating based on the monitor output (page 6, lines 11-15).

C. REJECTIONS/ARGUMENTS:

Each issue presented for review in Section VI is addressed hereinafter under the appropriate heading.

1. Claims 1-9 as they pertain to grounds of rejection 1-3 to be reviewed on appeal.

Claims 1-9 are directed to methods of manufacturing thermosetting powder coating compositions that achieve acceptable levels of dispersion at low operating pressure. These claims define over the cited references for the following reasons.

The Harmuth and Chang patents teach away from the low operating pressure of the present invention, resulting in a clear deficiency in establishing a prima facie *case of obviousness of claims 1-9.*

In order to establish a *prima facie* case of obviousness, the Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, 82 USPQ2d 1385, 1395-97 (2007) identified a number of rationales to support a conclusion of obviousness which are consistent with the proper "functional approach" to the determination of obviousness as laid down in *Graham v. John Deere*, 383 U.S. 1, 17 (1966). *See* MPEP §2143.

The Supreme Court in *KSR* noted that the analysis supporting a rejection under 35 U.S.C. §103 should be made explicit. One exemplary rationale that may support a conclusion of obviousness is that some teaching, suggestion or motivation in the prior art would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. However, "[w]hen the prior art teaches away from combining certain known elements, discovery of successful means of combining them is more likely to be nonobvious." *KSR*, 550 U.S. at ___, 82 USPQ2d at 1395.

a. The present invention claims a low-pressure extrusion process not suggested or implied by the combination of the Harmuth and Chang patents.

Claim 1 recites a step (B) of "injecting at least one hard to incorporate additive from a pressure vessel" to the base material of a thermosetting powder coating composition fed to an extruder "wherein the pressure in the pressure vessel is maintained at less than 100 psi". Claim 1 and dependent claims 2- 9 define over the prior art of record, which fails (alone or in any combination) to teach or suggest a process for manufacturing thermosetting powder coatings by injecting a hard to incorporate additive at a pressure below 100 psi.

In finally rejecting claim 1 and dependent claims 3-7 and 9 (reciting use of a pressure vessel wherein the pressure is less than 100 psi) for obviousness over the Harmuth and Chang patents, the Examiner asserts that the pigment dispersion (a downstream additive) disclosed by Harmuth would be implicitly fed from some vessel, and that such vessel is "reasonably understood to be a low-pressure vessel." In support of this assertion, the Examiner cites the operator's motivation to minimize cost and vapor emissions (and comply with environmental requirements) by conducting the extrusion at the lowest possible pressure.

To the extent that processes such as those disclosed by Harmuth or Chang may desirably be operated to minimize cost and vapor emission and/or to address environmental concerns for maintaining a lower operating pressure, those references disclose (either explicitly or implicitly) significantly higher operating pressures than the present invention. Furthermore, the differences in operating pressures are not merely differences in degree, but differences in kind, owing to the design of the present invention, which achieves acceptable dispersion in spite of Harmuth and Chang's teachings that a high operating pressure is required. Thus, the combination of Harmuth and Chang would not have led one skilled in the art to modify their teachings in order to arrive at the claimed low pressure extrusion process.

(1) The Harmuth Patent.

U.S. Patent No. 4,320,048 to Harmuth discloses an extrusion process wherein the non-pigment constituents (the resin(s), flow additive(s), curing agent(s), etc.) are introduced into a melt-extruder and a volatile liquid pigment dispersion is simultaneously introduced under high pressure at a point downstream of the non-pigment constituents (Abstract). In contrast to the "dry-mixing" process described above, Harmuth introduces a mixture of resin, pigment particles, and a volatile liquid downstream of the non-pigment constituents (col. 3, lines 54-58; col. 5, line 25-col. 6, line 43). In the Harmuth disclosure, up to 60% of the pigment dispersion is a volatile dispersing liquid. Owing to the volatility of this dispersing liquid and its relative abundance in the pigment dispersion, the extrusion process must be conducted at a pressure well above 100 psi. This high operating pressure is evidenced by the limitation of the Harmuth invention disclosed at col. 2, line 7 "removing the volatile liquid" and described as a "devolatization zone" at col. 5, lines 1-7.

(2) The Chang Patent.

U.S. Patent No. 4,973,439 to Chang et al. further discloses an injection means for the introduction of liquids into an extruder. Similarly, the Chang patent is directed to extrusion of toner particles at an average pressure of about 200-1500 psi also calls for volatilization of vapors (via vacuum extraction) at col. 6, lines 35-36.

Any such system (as disclosed by Harmuth and Chang) operated with a significant amount of volatile dispersants that must be extracted from the final extrudate is necessarily operated at high pressure. Accordingly, both Harmuth and Chang teach away from an extrusion process operating at pressure range below 100 psi.

(3) The Present Invention.

In contrast to the Harmuth and Chang patents, the present invention operates at a substantially reduced pressure of less than 100 psi. In support of the

non-obviousness of the subject matter of claim 1 and dependent claims 3-7 and 9, Applicants submitted the accompanying Declaration under 37 C.F.R. §1.132 of Joseph M. Ferencz ("Ferencz Dec."), an inventor of the present application, reproduced in the Evidence Appendix. The Ferencz Dec. demonstrates that one skilled in the art would be unable to practice the methods disclosed in Harmuth and Chang within the pressure range disclosed in the present application (page 1, line 21 – page 3, line 3.) Moreover, the Ferencz Dec. further evidences that it would not have been obvious to one skilled in the art to modify the apparatuses disclosed by Harmuth and Chang to operate at a pressure below 100 psi.

Thus, nothing would have led one skilled in the art to modify the teaching of Harmuth and Chang in order to arrive at the low-pressure extrusion process disclosed in the present invention. Accordingly, claims 1, 3-7 and 9 define thereover.

b. Nothing in the Rudolph or Fintel patents suggests or implies a method for dynamic control by the downstream addition of hard to incorporate additives.

As to claim 2, the final Office Action indicates that "Harmuth does not expressly teach the claimed monitoring and control steps." (page 5, lines 4-5), but that it would have been *prima facie* obvious to combine the teachings of Rudolph or Fintel with the teaching of Harmuth and Chang in order to provide a high quality powder coating material having the desired color.

Not only do the high pressure processes in the Rudolph and Fintel patents fail to cure the deficiencies of Harmuth and Chang patents, but Rudolph and Fintel are directed to processes which add color exclusively at the inlet point of the extruder. By contrast, the present invention achieves dynamic color control through downstream addition of one or more hard to incorporate additives. The means of dynamic control disclosed in Rudolph relates exclusively to the incorporation of additives to the hopper located at the extruder inlet (col. 2, lines 16-37). Likewise, Fintel discloses a process of

continuously adding colorants at an inlet point adjacent to or upstream of the base material. The Rudolph patent (alone or in combination with the Harmuth and Fintel patents) does not suggest or imply the addition of a hard to incorporate additive at the downstream location claimed in the present invention. Thus, one skilled in the art would not have been led by the teaching of Rudolph or Fintel to modify the apparatus disclosed by Harmuth to arrive at the present invention. Accordingly, claim 2 defines thereover.

c. Nothing in the Harmuth patent suggests or implies the production of various thermosetting powder compositions from a common base material.

As to claim 5, the Examiner cites the example in the Harmuth patent at col. 5 lines 26-col. 6 lines 42 as evidence that Harmuth suggests and implies that various thermosetting powder coatings may be formed using the same base material. The passage in Harmuth merely recites a comparison of a control composition formed by methods known in the art and an experimental composition formed by the claimed improvement. Although Harmuth discloses severable variables that can be adjusted to achieve a variety of extrudates, nothing in Harmuth suggests or implies a base material that is suitable for the production of more than one thermosetting powder coating as disclosed by the present invention. Harmuth's example discloses two distinct methods for creating the *same* product to highlight the advantage of one method over the other. Furthermore, the Harmuth patent's reference to a suitable pigment-binder/resin ratio (col. 1, lines 55-60) and examples of suitable pigments (col. 3, lines 25-30) indicate only that a variety of extrudates may be produced from a variety of base materials and/or pigment dispersions. As disclosed in the present application, batch-processing is common in the art (page 2, lines 10-14). In batch-processing, a particular downstream additive is incorporated with a particular base material in order to achieve a desired extrudate. Nothing in Harmuth teaches or suggests that the addition of a downstream

liquid pigment dispersion would allow an operator to produce a variety of thermosetting powder compositions from one base material, because different compositions are likely to vary not just as to the pigment dispersion added, but as to any number of hard to incorporate additives. By contrast, the present invention allows for different thermosetting powder coatings which may require different hard to incorporate additives (or different amounts of those additives) to be produced using the same base material (page 8, line 26 – page 9, line 2). Therefore, claim 5 defines over the combined teachings of Harmuth and Chang.

d. Nothing in the prior art teaches or suggests the low-pressure addition of a liquid or dried liquid pigment dispersion.

As to claims 7 and 8, neither the Rathschlag nor Dietz patents account for the failure of Harmuth to provide a reason to operate the extrusion process at a pressure below 100 psi. Thus, one skilled in the art would not be led by the teachings of Rathschlag or Dietz to modify the apparatus disclosed by Harmuth to operate at a pressure below 100 psi. Accordingly, claims 7 and 8 also define thereover.

e. In contrast to the present invention, Harmuth recites the addition of flow control additives exclusively as part of the base material.

As to claim 9, the Examiner cites the Harmuth patent (col. 3, lines 30-37; col. 1 lines 55-68) as evidence that the addition of flow control additives is known in the art. The passages cited, however, recite the addition of flow control additives exclusively as part of the base material. "Aside from a small portion of film-forming resin that is used to prepare the pigment dispersion as described below, *all* constituents but the pigment (the non-pigment constituents) form one feed stream to the extruder and the pigment dispersion forms a second feed stream." (Harmuth col. 3, lines 53-58) (emphasis added). By contrast, claim 9 is directed to a process of incorporating at least

one flow control additive that is not added as part of the base material. Appellants' specification discloses "at least one hard to incorporate additive [that] will not be added to the extruder as a base material" (page 3, lines 20-22), as recited in claim 9. Nothing in the prior art of record suggests or implies the addition of a flow control additive as anything but part of the base material. Thus, claim 9 defines thereover.

2. Claims 13-15, 21 and 22 as they pertain to grounds of rejection 4, 5 and 7 to be reviewed on appeal.

The addition of a dried liquid pigment dispersion to a resinous base material in the production of a thermosetting powder coating composition is not suggested or implied by the prior art of record.

Claims 13 - 15 (and dependent claims 21 and 22) are directed to a process of manufacturing thermosetting powder coating compositions in which a hyperdispersed pigment is added to a base material, where the hyperdispersed pigments are in the form of a dried liquid pigment dispersion—the crystalline residue formed from spray, vacuum or convection drying a liquid pigment dispersion comprising a greater than 5 weight percent organic solvent.

<u>a. Neither the Vanier application nor the Dietz patent teach an additional dispersion step</u>.

The Vanier publication and the Dietz patent are cited for teaching finely divided pigments that assertedly meet the hyperdispersed limitation in the claim. As defined in the specification, a hyperdispersed pigment is a pigment that has been subjected to additional grinding and/or dispersion steps that result in the pigments having an average particle size of 2.0 microns or less (page 4, lines 7-10). By definition, a hyperdispersed dried liquid pigment dispersion has undergone *both* an additional grinding step and a dispersion step. Such an additional dispersion step is not taught or suggested by the prior art of record.

(1) The Vanier application.

The Vanier application discloses that "pigments may be produced according to conventional pigment production methods and preferably are produced by milling stock organic pigments with grinding media having a particle size of less than 0.5mm." (Paragraph [0008]). Although the Vanier application discloses the production of pigments having a comparable size to the claimed hyperdispersed pigments, there is no teaching or suggestion to prepare a dried liquid pigment dispersion in the manner claimed in the present invention that comprises an additional dispersion step. Thus, nothing in Vanier would provide one skilled in the art any reason to use hyperdispersed pigments in the Harmuth process. Harmuth also is limited to teaching the use of milled pigments; the combination of Harmuth and Vanier would not lead the skilled artisan to use pigments other than milled pigments. Accordingly, claim 13 defines thereover.

(2) The Dietz patent.

The Dietz patent discloses a method for the fine division of pigments which comprises *dissolving* coarsely crystalline crude pigments in a solvent and precipitating them with a liquid precipitation medium in order to obtain a uniform pigment size. Claim 13 recites addition of a dried *dispersion* of pigments. One skilled in the art would distinguish between a pigment solution and a pigment dispersion. Because Dietz only considers drying a solution to obtain finely divided pigment particles, it does not provide a reason to modify Harmuth's teachings to subject a pigment to additional grinding and/or dispersion steps in order to obtain a hyperdispersed pigment as claimed by the present invention.

Furthermore, in contrast to the teachings of Dietz, the dried liquid pigment dispersion of the present invention is particularly formulated for use as a downstream additive in an extrusion process. As stated in the specification, "[u]se of a hyperdispersed pigment in any [liquid or dried liquid] form, according to the present

invention, facilitates the dispersion in the final coating formulation." (page 6, lines 8-10). Because the dried liquid pigment dispersion is specifically formulated for use in a melt extruder, it achieves greater dispersion in the final extrudate than it would if it were not subjected to an additional grinding and/or dispersion step.

The increased dispersion achieved by the present invention is a function of both decreased pigment size and the chemical nature of the liquid or dried liquid pigment dispersion. By contrast, any increased dispersion achieved by teachings of the Dietz patent is solely attributable to decreased particle size. Whereas the product of the Dietz patent consists exclusively of pigment particles, the dried liquid pigment dispersion claimed in the present invention contains particles of dried solubilized resin in addition to pigment particles (page 4, lines 18-19; page 5, lines 3-5). Nothing in the teachings of Dietz would lead one skilled in the art to combine pigment particles with a solubilized resin in a liquid or dried liquid pigment dispersion. Accordingly, claim 13 defines thereover.

<u>b. Nothing in the prior art of record teaches or suggests the addition of hyperdispersed pigments</u>.

As to claim 14, which recites dynamic control, neither the Rudolph nor Fintel patent account for the failure of Vanier or Dietz to provide a reason for using the claimed hyperdispersed pigments. Therefore, claim 14 also defines over the cited references.

<u>c. Nothing in the prior art of record teaches use of a common base material</u>.

Claim 15 defines over the prior art for the same reason that claim 5 defines thereover. Nothing in Harmuth teaches or suggests that the addition of a

downstream liquid pigment dispersion would allow an operator to produce a variety of thermosetting powder compositions from one base material, because different compositions are likely to vary not just as to the pigment dispersion added, but as to any number of hard to incorporate additives. By contrast, the present invention allows for different thermosetting powder coatings which may require different hard to incorporate additives (or different amounts of those additives) to be produced using the same base material (page 8, line 26 – page 9, line 2). Moreover, nothing in Vanier or Dietz account for the failure of Harmuth to disclose the use of a common base material to produce a variety of thermosetting powder composition. Thus, claim 15 defines thereover.

d. Nothing in the prior art of record teaches or suggests the injection of hyperdispersed pigments.

As to claim 21, the liquid injection method taught by Chang does not account for the failure of the Harmuth and Vanier or Dietz references to provide a reason for using the claimed hyperdispersed pigments. Thus, one skilled in the art would not be led by the teachings of Chang to use hyperdispersed pigments in the methods taught by Harmuth and Vanier or Dietz. Accordingly, claim 21 also defines thereover.

e. Nothing in the prior art of record teaches or suggests the incorporation of hyperdispersed pigments at an operating pressure below 100 psi.

Claim 22 is directed to a low pressure extrusion process (below 100 psi) that incorporates hyperdispersed pigment dispersions. For the reasons outlined in sections A and B above, nothing in the prior art of record teaches or suggests an operating pressure range below 100 psi. The Harmuth and Chang patents both disclose volatile liquid pigment dispersions that require a high operating pressure.

Likewise, nothing in the prior art of record teaches or suggests the use of a dried liquid pigment dispersion that has been subjected to an additional grinding and dispersion step. Therefore, there is no rationale to support the rejection of claim 22 on the basis of the prior art of record.

3. Claims 17-19, 23 and 24 as they pertain to grounds of rejection 6 and 8 to be reviewed on appeal.

Nothing in the prior art of record teaches or suggests dynamic color control of an extrusion process that dynamically adjusts the amount of hyperdispersed dried pigments added to the base material.

Claim 17 is directed to a process for dynamic color control in a thermosetting powder coating extrusion process which also includes a step of adding hyperdispersed pigments to a base material in an extruder, where the hyperdispersed pigments are in a *dried* form. Claim 17 defines over the combined teachings of Harmuth plus Vanier/Dietz with the Rudolph/Fintel references for the same reasons that claims 13 and 14 define thereover. One skilled in the art would have no reason to use a dried pigment dispersion in a melt extruder as disclosed by Harmuth because such a dispersion is directly counter to Harmuth's teachings. Moreover, the method of dynamic control disclosed by Chang only pertains to "liquid injection" additives (col. 1, line 19, line 24, line 64; col. 2, line 27 and line 38). Thus, Chang's teachings do not supplement the teachings of Harmuth plus Vanier/Dietz with the Rudolph/Fintel references. Claim 17 is directed to a process that achieves dynamic control over the composition of extrudate by manipulating the amount of hyperdispersed *dried* pigments added to the extrusion stream. Therefore, there is no rationale to support the rejections of claims 17-19 and 23 on the basis of the prior art of record.

Claim 18 defines over the prior art for the same reason that claim 5 defines thereover. Nothing in Harmuth teaches or suggests that the addition of a downstream liquid pigment dispersion would allow an operator to produce a variety of

thermosetting powder compositions from one base material, because different compositions are likely to vary not just as to the pigment dispersion added, but as to any number of hard to incorporate additives. By contrast, the present invention allows for different thermosetting powder coatings which may require different hard to incorporate additives (or different amounts of those additives) to be produced using the same base material (page 8, line 26 – page 9, line 2). Moreover, nothing in Vanier/Dietz or Rudolph/Fintel account for the failure of Harmuth to disclose the use of a common base material to produce a variety of thermosetting powder composition. Accordingly, claim 18 also defines thereover.

Nothing in the prior art of record teaches or suggests an extrusion process for producing a thermosetting powder composition which operates at a pressure below 100 psi, uses dried hyperdispersed pigments, and achieves dynamic color control by downstream addition of hard to incorporate additives.

Claim 24 depends from claim 17 and recites three patentably distinct features.

(1) Claim 24 is directed to an extrusion process for producing a thermosetting powder coating that operates at a pressure below 100 psi. The combination of Vanier or Dietz and Rudolph or Fintel do not account for the Harmuth and Chang patents' teaching away from this pressure range, and claim 24 defines thereover.

(2) Claim 24 is directed to an extrusion process in which hyperdispersed pigments are added to the extrudate. The prior art of record does not disclose the use of pigments other than milled pigments, and the combination of the Vanier or Dietz, Rudolph or Fintel and Chang references would not lead one skilled in the art to modify the teachings of Harmuth to use the claimed hyperdispersed pigments. Accordingly, claim 24 defines thereover.

(3) Claim 24 is directed to a method of dynamic color control that is achieved by the downstream addition of dried hyperdispersed pigments at low pressure. The combined teachings of Harmuth, Vanier or Dietz, Rudolph or Fintel and Chang would not provide one skilled in the art with a reason to dynamically control the composition of the extrudate by the downstream addition of a dried hyperdispersed pigment at a pressure below 100 psi. Accordingly, claim 24 defines thereover.

VIII. CONCLUSION

Upon proper recognition that neither the Harmuth nor the Chang patent relates to the incorporation of hard to incorporate additives at pressures below 100 psi; that neither Randolph nor Fintel relate to the dynamic control of hard to incorporate additives; that the Vanier publication fails to disclose an additional dispersion step; that the Dietz patent does not disclose a method of dispersion as claimed in the present invention; that the combination of references cited does not teach or suggest the incorporation of hyperdispersed pigments at low pressure; and that the combination of references cited does not teach or suggest a method for dynamic control of a dried pigment dispersion operating at low pressure, rejection of claims 1-9, 13-15, 17-19, and 21-24 should be withdrawn. Reversal of the final rejection and allowance of the pending claims is respectfully requested.

The Commissioner is authorized to charge any additional fees which may be required to Deposit Account No. 16-2025. Please refund any overpayments to Deposit Account No. 16-2025.

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CLAIM APPENDIX

1. A process for manufacturing thermosetting powder coating compositions, comprising:

A) feeding a base material comprising as dry ingredients, a resin and a curing agent to an extruder from an initial position;

B) injecting at least one hard to incorporate additive from a pressure vessel to the base material after the base material enters the extruder and before it exits the extruder, wherein the pressure in the pressure vessel is maintained at less than 100 psi; and

C) passing the combined base material and hard to incorporate additive(s) through at least a portion of the extruder to form a thermosetting powder coating composition.

2. The process of Claim 1, further comprising the step of D) monitoring the output from the extruder and dynamically adjusting, as needed, the amount of hard to incorporate additive(s) added to the extruder in step B) to dynamically control the manufactured thermosetting powder coating based upon the monitored output.

3. The process of Claim 1, wherein the base material travels through a portion of the extruder before the addition of hard to incorporate additive(s) in step B).

4. The process of Claim 1, wherein the hard to incorporate additive(s) are introduced to the extruder at the initial position.

5. The process of Claim 1, wherein steps A-C) are repeated for different thermosetting powder coatings, and wherein the different thermosetting powder coatings utilize a common base material.

6. The process of Claim 1, wherein the hard to incorporate additive comprises pigment(s).

7. The process of Claim 1, wherein the hard to incorporate additive comprises pigment(s) dispersed in a liquid pigment dispersion.

8. The process of Claim 1, wherein the hard to incorporate additive comprises pigment(s) dispersed in a dried liquid pigment dispersion.

9. The process of Claim 1, wherein the hard to incorporate additive comprises one or more flow additives.

13. A process for manufacturing thermosetting powder coating compositions, comprising:

A) feeding a base material comprising as dry ingredients, a resin and a curing agent to an extruder from an initial position;

B) adding at least one hyperdispersed pigment to the base material; and

C) passing the combined base material and hyperdispersed pigment(s) through at least a portion of the extruder to form a thermosetting powder coating composition;

wherein the hyperdispersed pigment(s) in step B) are added either separately from the base material or with the base materials, and when added with the base material, the hyperdispersed pigment(s) are in the form of a dried liquid pigment dispersion that has been formed from a liquid pigment dispersion comprising greater than 5 weight percent organic solvent.

14. The process of Claim 13, further comprising the step of D) monitoring the output from the extruder and dynamically adjusting, as needed, the

amount of hyperdispersed pigment(s) added to the extruder in step B) to dynamically control the manufactured thermosetting powder coating based upon the monitored output.

15. The process of Claim 13, wherein steps A-C) are repeated for different thermosetting powder coatings, and wherein the different thermosetting powder coatings utilize a common base material.

17. A process for dynamic color control in a thermosetting powder coating extrusion process, the color control process comprising the steps of:

A) determining an amount of hyperdispersed pigment(s) to be added to base material comprising as dry ingredients, a resin and a curing agent introduced to an extruder to form a thermosetting powder of a desired color;

B) adding the determined amount of hyperdispersed pigment(s) to the base material;

C) monitoring the output of the extruder for accuracy of the color of the thermosetting powder coating; and

D) dynamically adjusting, as necessary, the amount of pigment(s) added at step B) based upon the monitored output;

wherein the base material travels through a portion of the extruder before the addition of pigment(s) in step B), or the pigment(s) added in step B) are added to the extruder at the same location as the base material, or the pigment(s) added in step B) are added to the extruder with the base material, and when added to the extruder with the base material, the pigment(s) are in the form of a dried liquid pigment dispersion formed from a liquid dispersion comprising greater than 5 weight percent organic solvent.

18. The process of Claim 17, wherein steps A-D) are repeated for different thermosetting powder coatings having different colors and/or different

formulations, and wherein the different thermosetting powder coatings utilize a common base material.

19. The process of Claim 17, wherein the pigment(s) are added in the form of a liquid pigment dispersion after the base material travels through a portion of the extruder or at the same location as the base material.

21. The process of Claim 13, wherein the addition of step B) is by injection.

22. The process of Claim 21, wherein the injection uses:

a low pressure vessel;

a source pressurization coupled to the pressure vessel;

a mechanism for maintaining the pressure in the pressure vessel less than 100 psi;

a flow regulator; and

an injector outlet downstream of the flow regulator.

23. The process of Claim 17, wherein the addition of step B) is by injection.

24. The process of Claim 23, wherein the injection uses:

a low pressure vessel;

a source of pressurization coupled to the pressure vessel;

a mechanism for maintaining the pressure in the pressure vessel less than 100 psi;

a flow regulator; and

an injector outlet downstream of the flow regulator.

EVIDENCE APPENDIX

Declaration of Joseph M. Ferencz.

RELATED PROCEEDING APPENDIX

None.